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USING PHOTOGRAPHY FOR RECREATION RESEARCH

by

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ABSTRACT

A photographic technique was developed and tested. The test showed that 35-mm color slides were better than black and white prints and 8-mm color movie formats for recording and identifying information about recreationists driving forest roads. Black and white prints proved to be more reliable for this purpose than 8-mm color movies. None of the formats allowed reliable identification of all the information obtained through direct observations and conversations with recreationists. The formats permitted reliable identification of only the number and type of vehicles using forest roads. Recreation equipment could be identified only slightly over 50 percent of the time. Number of people, group composition of parties, age, and recreation activity were the variables most difficult to identify (2 to 44 percent of the time depending on which of the three formats was used). There was little variation in scores generated by three groups of photo coders--(1) university students, (2) Forest Service managers, and (3) recreation researchers.

KEYWORDS: Survey methods/planning, photography, data recording methods, recreation surveys, recreation.

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INTRODUCTION

Land managers, planners, and researchers constantly seek to devise field measures to efficiently and reliably monitor recreation use on forest lands. They now use questionnaires, interviews, direct observations, and self registration techniques to obtain recreation use information about forest visitors. Several recent developments suggest that photography can be a useful field instrument in the production of reliable data on recreationists. For example, relatively simple and economical photographic techniques have been developed which permit more effective use of man-hours and in some cases can produce more reliable information than is usually obtainable with conventional data collection methods (Baker 1974). In addition these techniques use equipment that is readily available (Marnell 1977). Perhaps the most important advantage photography holds for recreational research is its potential for increased confidence in research results, permitting as it does the use of tests for intercoder reliability. Despite its great potential, photography has not been used to obtain selected social data on recreationists useful in social research analysis and recreation planning.

The purpose of this paper is to describe a 1975 study designed to assess the potential of photography as a reliable field technique for producing selected social data on recreationists in motorized vehicles entering National Forests. The threefold objective of this study was to: (1) test three inexpensive camera systems under identical conditions to determine their individual effectiveness for recording social data about recreationists driving forest roads; (2) compare the quality of these photographic data with identical baseline social data obtained through direct observation and conversation with recreationists and; (3) develop techniques for coding, recording, and analyzing visitor use information identifiable from 35-mm color slides, 5-x7-inch black and white prints and 8-mm color movie frames. Specifically, the variables on which data were obtained through the use of these camera systems included: (a) type of vehicle, (b) number in party, (c) group composition, (d) equipment used, (e) age, i.e., child, teen, adult, senior citizen, (f) license number--place of origin, and (g) recreation activities pursued.

METHODOLOGY

Data for this study were collected through direct observation and conversations with recreationists and by photographing these parties with selected camera systems.

Three cameras were used in the study. Camera #1 was a 35-mm still, single lens reflex (through the lens light metering system). Its lens was standard size with a focal length of 49 mm, Fl. 4. Kodachrome color slide film, with an ASA value of 64, was used. Camera #2 was also a 35-mm still, single lens reflex through the lens metering system. Its lens was standard size with a focal length of 58 mm, Fl. 4. Plus-X black and white film, with an ASA value of 125, was used. Camera #3 was an 8-mm color movie camera with automatic aperture setting and capable of producing single-frame exposures. It had a telephoto zoom lens with a focal length of 50 mm, Fl. 8. Ektachrome 160, type G Super 8 color movie film was used.

The testing of the camera systems took place on two selected road systems: the Clackamas Highway on the Clackamas Ranger District, Mt. Hood National Forest in western Oregon, and the Greenwater Road System on the White River Ranger District, Mt. Baker-Snoqualmie National Forest in western Washington. The two areas were chosen because they are typical of dispersed road recreation settings in the Pacific Northwest and had been selected previously for recreation studies because they fit selected criteria (Hendee, Hogans, Koch 1976).

At the time of the study, all visitors to National Forests in the Pacific Northwest Region were required to stop for a fire prevention check before entering. During this required stop, field technicians in the study areas obtained the criterion baseline data through direct observation and conversations with selected recreation parties. At the same time, the recreationists' permission to take the photographs was solicited and granted by all parties. The fire prevention check point was designated Station No. 1.

The photographic data were obtained at designated Station 2, 100 feet from Station 1. The three cameras were located 40 feet from the center of the road on individual tripods adjacent to one another and turned at a 45-degree angle to the road. They were focused to infinity and aimed at a large red marker positioned along the opposite side of the road 45 feet away. Each camera system was operated independently by a field technician. Figure 1 and 2 illustrate the relationship between the two Stations.

The vehicles passing Station 2 were traveling at less than 25 miles per hour, because they did not have time to gain speed after departing Station 1. Once the vehicle approached the red marker, they were photographed by camera operators and assigned unique numbers on special forms corresponding to the camera frame number.

The test films were processed for average resolution by commercial photo finishers. Prints (5-x7-inch) were made from the exposed black and white negatives; color slides were mounted in 2-x2-inch slide mounts for screen viewing; 8-mm color movie films were placed on standard movie reels for viewing with a single frame movie projector.

Data Analysis

Once the films were processed, photographs were selected for analysis and coded for review by photo coders. Photo coders were then selected, shown the photographs, and their responses were recorded and evaluated.

A total of 50 subjects were photographed by each of the camera systems. From this total, 15 subjects, each photographed by a different camera system, were randomly selected for analysis. The 15 color slides of the subjects represented Treatment No. 1; the fifteen 5-x7-inch black and white prints represented Treatment No. 2; and the fifteen 8-mm color movie frames constituted Treatment No. 3. All three treatments were of the same subjects but in different formats.

Figure 1.--Baseline information being gathered from recreationists at Station 1.

Figure 2.--Photographic information being gathered on recreationists at Station 2 by camera operators after vehicle departed Station 1.

A score sheet was developed on which photo coders could check the relevant variables identified in their perception of the 45 photographs. Raw scores derived from the photo coders were determined by giving a score of "one" for each correctly identified variable.

From 3 different groups, 15 volunteer photo coders were selected to review the 3 treatments. Group 1 was composed of five undergraduate students (seniors) majoring in outdoor recreation at the University of Washington's College of Forest Resources. This group represented potential seasonal or technical staff that an agency like the U.S. Forest Service might hire to review photo data if camera applications were adopted.

Group 2 included five professional staff members of the Mt. Baker Snoqualmie National Forest Supervisor's Office in Seattle. This group represented the administrative staff, which would be responsible for the planning and training of technical staff to install cameras and review data if camera applications were adopted.

Group 3 was composed of five professional and technical staff members from the Forest Service's Recreation Research Project in Seattle. This group represented a mixture of Groups 1 and 2, i.e., technical staff, which would review and summarize the photo data, and administrative staff to plan and train technical staff for camera applications and data analysis.

The three groups of coders were separately exposed to three photo treatments. The order of exposure to the treatments was rotated for each group as shown below.

	Treatment sequence		
Group number	1st	2d	3d
1	Color slides	Black and white prints	8-mm movies
2	Black and white prints	8-mm movies	Color slides
3	8-mm movies	Color slides	Black and white prints

The purpose of this rotation procedure was to distribute equally and cancel out any bias that may have resulted from coders becoming fatigued during the testing.

Just before they were shown the photographs, each group was given a brief verbal explanation of the study and specific instructions. They were then given a blank score sheet containing the relevant variables. These variables were explained and defined to each group in the same manner. Each coder put his or her name on the score sheets and began the evaluation.

Treatment Presentations

Fifteen color slides were projected one at a time on a screen. Each slide remained on the screen for 60 seconds, after which the screen was darkened for 5 seconds. Then another slide was projected. The process was repeated until all 15 slides had been reviewed.

Individual packets of fifteen 5-x7-inch, black and white glossy prints were given to each photo coder for review. These were photographs of the same subjects in Treatment 1, but in reverse order to cancel out any bias resulting from coders "learning" during the test. Each print had numbered codes on the back, which the group was instructed to put in a special column on the score sheet next to their evaluations. Coders were allowed to view each print for 60 seconds, after which a blank page was viewed for 5 seconds; and the process was repeated until all 15 prints had been reviewed.

For each group, fifteen 8-mm color movie frames were individually projected onto a screen. These 15 frames were of the same subjects as in Treatments 1 and 2 but in a different order. Each frame remained on the screen for 60 seconds after which the screen was darkened for 5 seconds; then another treatment frame was projected and the process repeated until all 15 frames had been reviewed and evaluated by coders.

RESULTS

Photo Coding is Reliable

The greatest variation in coders' scores was between photograph formats and not between groups. For the most part, none of the three groups of photo coders had any advantage in identifying variables from the photographs (table 1). There was only 2 percentage points difference between

Table 1--*Percentage of baseline variables correctly identified from color slides, black and white prints, and 8-mm movie photograph formats by the three photo-coder groups*

Photo coder group	Photograph format		
	Color slides	Black and white prints	8-mm color movies
	- - - - - - - - - - - Percent - - - - - - - - - - -		
Group 1	38	35	33
Group 2	38	33	31
Group 3	36	33	30

the group scores on color slides (36-38 percent), 2 percentage points difference on black and white prints (33-35 percent), and 3 percentage points difference on 8-mm movie frames (30-33).

The groups of photo coders did not increase their accuracy as they progressed from Treatment 1 to Treatment 3. This suggests that the coders did not carry their perception of one photograph format into another, nor did they become fatigued as they went through the treatment sequence. The variation in scores from one format to the next for all three groups' treatment sequence indicates that scores were more a function of individual format than any other extraneous factor (table 2, 3, 4). Table 2, for example, shows that Group 1 scores decreased from a high of 38 percent correct for color slides (Treatment 1) to 33 percent correct for 8-mm movies (Treatment 3). Conversely, the average score for Group 2 (table 3) increased from 33 percent correct for black and white prints (Treatment 1) to 38 percent correct for color slides (Treatment 3). Table 4 shows that Group 3 scores increased from 30 percent correct for 8-mm movies (Treatment 1) to 36 percent correct for color slides (Treatment 2), then decreased to 33 percent correct for black and white prints (Treatment 3).

Table 2--*Distribution of scores for individual photograph formats by GROUP 1 in the sequence they were exposed to each*

Photo format and sequence	Baseline variables							
	Vehicle type	Number of people	Group composition	Recreation equipment	Age	License	Activity	Average total
	Percent							
(1) Color slides	100	46	19	51	20	1	28	38
(2) Black and white prints	100	31	8	57	15	0	32	35
(3) 8-mm color movies	100	27	7	51	12	0	32	33
Average total	100	35	11	53	16	0	31	35

In general there was little variation in coders' raw scores for individual variables. The widest variation in scores among intracoder groups was in the 8-mm color movie format for variables such as number of people and age. No coder variable was identified to account for the wide variation in scores from the 8-mm color movie format. This, however, suggests that 8-mm color movies are less reliable than the other two formats for identifying detailed recreation use data.

Color Slides Superior Over Other Formats

Color slides permitted greater identification of all the social baseline variables than either the black and white prints or 8-mm color movie frames (table 5). On the average the most variables were identified from

Table 3--*Distribution of scores for individual photograph format by GROUP 2 in the sequence they were exposed to each*

Photo format and sequence	Baseline variables							
	Vehicle type	Number of people	Group composition	Recreation equipment	Age	License	Activity	Average total
	Percent							
(1) Black and white prints	100	37	7	46	10	0	33	33
(2) 8-mm color movies	100	33	0	38	6	0	37	31
(3) Color slides	100	46	16	56	11	0	38	38
Average total	100	39	8	47	9	0	36	34

Table 4--*Distribution of scores for individual photograph format by GROUP 3 in the sequence they were exposed to each*

Photo format and sequence	Baseline variables							
	Vehicle type	Number of people	Group composition	Recreation equipment	Age	License	Activity	Average total
	Percent							
(1) 8-mm color movies	100	27	0	46	6	0	33	30
(2) Color slides	100	40	13	55	11	0	32	36
(3) Black and white prints	100	35	4	50	7	0	35	33
Average total	100	34	6	50	8	0	33	33

Table 5--*Percentage of baseline variables correctly identified from color slides, black and white prints, and 8-mm movie photograph formats by the three photo-coder groups*

Photo format	Baseline variables							
	Vehicle type	Number of people	Group composition	Recreation equipment	Age	License	Activity	Average total
Color slides	100	44	16	54	14	0	33	37
Black and white prints	100	34	6	51	11	0	33	34
8-mm color movies	100	29	2	45	8	0	34	31

35-mm color slides (37-percent correct) followed by 5-x7-inch black and white prints (34-percent correct) and 8-mm movies (31-percent correct). Only one variable, type of vehicle, was correctly identified (100 percent) on all photograph formats by all three groups of coders.

Except for number of people, the overall difference between color slides and black and white prints was small.

Some of the differences between the three formats seem small enough to be the result of chance variation, while other differences are probably too large to have been created solely by chance. The consistent patterns of results across various dependent variables, however, suggests that the differences are not a result of chance. This suggests that color slides are better than 8-mm movies and black and white prints for providing social data on recreationists.

The overall superiority of color slides in this test was underscored by the fact that recreation equipment was identified from slides on the average 9 percentage points greater (54-percent correct) than 8-mm movie film (45-percent correct) and 3 percentage points greater than black and white prints (51-percent correct). Color slide scores for number of people (44-percent correct) were 15 percentage points better than 8-mm movies (29-percent correct) and 10 percentage points better than black and white prints (34-percent correct). For the other variables, color slide scores were better or as good as the other formats. Recreation activity was identified on the average 3 out of 10 times (33-percent correct) from the slides, which was equal to black and white prints (33-percent correct) and 1 percentage point lower than 8-mm movies (34-percent correct). Other scores for color slides were: group composition 16 percent, and age 14 percent. Only one license number was correctly identified from the slides.

Even though the three groups on the average identified the correct number of people in a vehicle only 44 percent of the time from the color slides, they identified the correct number of people in parties of three or less 63 percent of the time. Scores for all groups decreased as the number of people in each party increased from three as user images became indistinguishable. This could not be done in the other film formats. The three photo coder groups also correctly identified 54 percent of all recreation equipment from color slides. They were, however, able to correctly identify 88 percent of all equipment located on the outside of the principal transportation vehicle, such as wood-hauling trailers, motorbikes, rafts, boats, and fishing gear.

Black and White Prints Superior Over 8-mm Color Movies

Even though black and white prints proved to be less reliable than color slides for producing social data, they are somewhat better than 8-mm color movies (table 5). Overall, black and white print scores (34 percent) were 3 percentage points better than 8-mm color movies (31 percent). Black and white prints, however, were substantially better than 8-mm movies for variables such as number of people and recreation equipment.

Photography is Limited in Producing Social Data

Photography in this test proved less reliable than direct observation and personal contacts in producing selected social data about recreationists driving forest roads (table 6). Photographs at best permitted identification of all social baseline data--obtained through personal contact and direct observations--only 37 percent of the time. This suggests the superiority of human observations and conversation over photographic systems of the type tested here for obtaining selected social data. Group composition, age, license, and activity were the most difficult variables to identify through photography. They could only be identified from 0 to 38 percent of the time.

Table 6--*A comparison between three photograph formats and observation techniques for identifying variables and answering questions about recreation use in roaded areas of forest environs*

Variables sought and questions to be answered	Percentage of questions answered by coders from the three photo formats and through human means			
	35-mm color slides	5"x7" black and white prints	8-mm color movie	Conversations and direct observations
1. How many and what type of vehicles are recreationists using?	100	100	100	100
2. How many recreationists are using areas?	44	34	29	100
3. What is the group composition of recreation parties?	16	6	2	100
4. What kind and how much recreation equipment do recreationists bring into the area?	54	51	45	100
5. What are the approximate ages of the recreationists using the area?	14	11	8	100
6. What is the license number of the recreationists using the area so origin can be determined?	0	0	0	100
7. What kind of activities do recreationists pursue in this area?	33	33	34	100

CONCLUSIONS

The following conclusions were drawn from the foregone data and apply only to photography systems and conditions experienced in this test.

1. Despite its great potential, photography proved less reliable than direct observation and conversations--under field conditions--in producing selected social data on recreationists driving forest roads.

2. It is possible to reliably identify the number and type of recreation vehicles using forest roads from photography.

3. Photography cannot reliably identify recreation user characteristics, such as number of people, age, group composition, recreation activity, and equipment, and will consistently underestimate the frequency of these variables.

4. Large projection format 35-mm color slides proved more suitable for identifying social data on recreationists than either black and white prints or 8-mm color movie formats. Black and white prints are better for this purpose than 8-mm color movies.

5. Photo coding among individuals in this test proved reliable. Undergraduate students proved as adept as Forest Service managers at identifying recreation use information from photographs.

RECOMMENDATIONS

Although it is not possible to prescribe for all conceivable circumstances from the results of one study, the following recommendations seem warranted until additional experience and research results are available.

1. Land managers, planners, and recreation researchers should not rely solely on photography to produce reliable user-characteristic information on recreationists driving forest roads until further research on this problem is completed, or until the technology is further advanced.

2. Future research should investigate ways to advance the art of measuring and analyzing social data on recreationists from photographs.

3. Further testing of photo-technology application to recreation use measurements should continue with additional evaluation of (a) camera systems variables, (b) camera site location and placement variables, and (c) recreation user variables. These variables are the critical elements in a successful photography program for gathering reliable information on recreation use.

LITERATURE CITED

Baker, William T.
1974. New photographic techniques in highway engineering. Modern Government (March): 42-46. Washington, D.C.

Hendee, John C., Mack L. Hogans, and Russell W. Koch.
1976. Dispersed recreation on three forest systems in Washington and Oregon: first year data. USDA For. Serv. Res. Note PNW-280, 21 p. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

Marnell, Leo F.
1977. Methods for counting river recreation users. In River recreation management and research. USDA For. Serv. Gen. Tech. Rep. NC-28, p. 77-82. North Cent. For. Exp. Stn., St. Paul, Minn.

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